

We Claim:

1. A digital communications system comprising:
  - a connection-oriented transport fabric;
  - a plurality of user devices attached to the system, at least some of said user devices including LAN interface adapters for connection to said transport fabric through one or more local area networks (LANs);
    - 5 interface means between said transport fabric and said user devices storing the location of said user devices, said interface means between said transport fabric and said user devices that are connected to LANs adapting LAN traffic for transport over said transport fabric; and
    - 10 a centralized route server connected to said transport fabric storing address data pertaining to the location of said user devices attached to the system, said centralized route server exchanging data over said transport fabric with said interface means to learn the locations of said user devices and to distribute such information to said interface means so as to permit said interface means to establish direct transparent communication on demand using a dynamic mesh of virtual connections between a said user device connected thereto and another said user device attached to the system.
  2. A digital communications system as claimed in claim 1, further comprising a system manager controlling the operation of said connection-oriented transport fabric and informing the route server of the topology thereof.
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  3. A digital communications network comprising:
    - a connection-oriented transport fabric;
    - a plurality of peripheral devices;
    - interface means between said transport fabric and said peripheral devices
    - 25 storing the location of said peripheral devices;
    - a centralized route server connected to said transport fabric storing address data pertaining to the location of said peripheral devices, said centralized route server exchanging data over said transport fabric with said interface means to learn the locations of said peripheral devices and to distribute such information so as to permit said interface means to establish direct transparent communication on demand using a

dynamic mesh of virtual connections between a said peripheral device connected thereto and another said peripheral device attached to the system.

4. A digital communications system as claimed in claim 3, wherein at least some of said peripheral devices are connected to said interface means over a network.
5. A digital communications system as claimed in claim 4, wherein said network is a connectionless network.
6. A digital communications system comprising a transport fabric, access devices having ports for permitting access to said transport fabric, and means for transmitting data including errors from a port to be monitored over said network to a remote monitoring site to replicate the data from said monitored port at said remote monitoring site, whereby tests can be conducted on said monitored port remotely as if on-site.
7. A digital communications system as claimed in claim 5, further comprising a centralized route server for distributing topology information to said access devices.
8. A digital communications system as claimed in claim 6, further comprising means for tagging monitored data packets to prevent them from being treated as normally received packets by the receiving interface means.
9. A digital communications system comprising a connection-oriented transport fabric comprising at least one packet switch, a centralized OAM (Operations and Maintenance) resource, and means for extracting OAM packets from a packet stream and redirecting said packets through the transport fabric to said centralized OAM resource for processing.
10. A digital communications system as claimed in claim 9, wherein said connection-oriented transport fabric is an ATM network and said packets are ATM cells.
11. In a digital communications system, an interface between a connectionless and connection-oriented network, comprising means for snooping the incoming first packet from the connection-oriented network and deriving the destination address

therefrom, and means for appending the thus-derived address to outgoing frames on the connectionless network.

12. A digital communications system as claimed in claim 11, wherein said destination address is the MAC address.

5      13. An interface device for establishing communication between a connection-oriented transport fabric and a connectionless fabric in a digital communications system having a centralized route server, said interface device comprising first port means for connection to said connection-oriented fabric, second port means for connection to the connectionless fabric, translation means for translating data between formats adapted for said connection-oriented and connectionless networks, a memory for receiving and storing information from said centralized route server pertaining to the location of devices attached to the system, and a transfer engine for forwarding received data toward its destination using said stored information.

10     14. A method of establishing communications between user devices connected to a digital communications system comprising the steps of:

15        providing access means to said connection-oriented network;  
              storing address data pertaining to the location of said peripheral devices attached to the system in a centralized route server connected to said connection-oriented network; and

20        exchanging address data over said connection-oriented network with said interface means to learn the locations of said peripheral devices and to distribute such information to said access means so as to permit said access means to establish direct transparent communication on demand using a dynamic mesh of virtual connections between a said peripheral device connected thereto and another said peripheral device attached to the system.

25     15. A method as claimed in claim 14, wherein said access means set up switched virtual connections through said ATM network to establish communication therebetween based on address data received from said centralized route server.

16. A method of controlling a digital communications system with a connection-oriented transport fabric comprising the steps of extracting OAM (Operation and Maintenance) packets from a packet stream in a packet processing engine, and redirecting said OAM packets through the transport fabric to a centralized OAM resource for processing.
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17. A method of processing packets entry into a connection-oriented transport fabric, comprising the steps of:
- 10 (a) periodically distributing routing information for devices connected to the transport fabric to access devices connected thereto from a centralized route server over said transport fabric;
- (b) receiving an incoming packet at a said access device;
- (c) determining the destination address of said packet at said access device;
- (d) looking up said destination address in said access device to identify the route to the destination address; and
- 15 (i) if said destination address is stored in said access device, forwarding said incoming packet to the destination in accordance with information stored in said access device; or
- (ii) if said destination address is not stored in said access device, forwarding said incoming packet to said centralized route server for further processing.